User’s manual

NGC-105

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chapter 3	add.	
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chapter 8		

new: The corresponding chapters are new or completely revised.
corr.: Passages of the corresponding chapter were corrected; see modification bars.
add.: Passages of the corresponding chapter were added; see modification bars.

This manual refers to the following hardware:

NGC-105	R9832305

Document History

Modifications which result in a new version are indicated by a vertical bar.

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The environmental conditions as well as the servicing and maintenance regulations specified in this manual must be complied with by the customer.

Revision sheet

To:

- **Barco Control Rooms GmbH**
  An der Rossweid 5, D-76229 Karlsruhe
  Phone: +49-721-6201-0, Fax: +49-721-6201-298
  E-mail: docu.de.bcd@barco.com, Web: www.barcocontrolrooms.com

From: _____

Date: _____

Please correct the following points in this documentation (**R59770204**):

page	wrong	correct

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1 Introduction

This chapter explains the structure of the manual itself and the used typographic styles and symbols. Safety information is provided concerning the operation of computer systems from Barco.

1.1 Application and target group

This documentation is aimed for operators of NGC-105 devices.

1.2 How this manual is organized

This manual describes design and operation of NGC-105 from Barco. It is divided into eight chapters:

- **Introduction**
  explains the structure of the manual itself and the used typographic styles and symbols. Safety information is provided concerning the operation of computer systems from Barco.
- **Summary**
  gives an overview about the features of NGC-105.
- **The device and its components**
  describes the look of NGC-105 and its components.
- **Operating**
  explains the operation of NGC-105.
- **Maintenance**
  describes the maintenance of NGC-105.
- **Technical Appendix**
  gives tabular overviews about the technical details of NGC-105.
- **Troubleshooting**
  gives advice, if NGC-105 does not operate properly.
- **Index**
  lists the keywords of the manual.

Chapters, pages, figures and tables are numbered separately. Chapters are indicated by a »point syntax«, e. g. **4.2.3**, pages by a »dash syntax«, e. g. **2-1**, as figures and tables are, e. g. **figure 5-4**.

1.3 Styles and symbols

The typographic styles and the symbols used in this document have the following meaning:

Bold	Labels, menus and buttons are printed in the **Bold** font.
Condensed	Links to both other chapters of this manual and to sites in the Internet are printed condensed. In the on-line version of this manual all hyperlinks appear teal.
`Courier`	Names of files and parts from programs are printed in the `Courier` font.
`Courier bold`	Inputs you are supposed to do from the keyboard are printed in **`Courier bold`** font.

↳	**Within a piece of programming code this arrow marks a line, that must be made up in two lines, though meant to be one line.**
	If you do not heed instructions indicated by this symbol there is a risk of damage to the equipment!
	If you do not heed instructions indicated by this symbol there is a risk of electric shock and danger to personal health!
	If you do not heed instructions indicated by this symbol there is a risk of damage to parts, which are sensitive towards electrostatic charge!
	If you do not heed instructions indicated by this symbol there is a risk to get harmed by sharp objects!
	If you do not heed instructions indicated by this symbol there is a risk that parts may explode!
	If you do not heed instructions indicated by this symbol there is a risk that hot parts impact persons or objects!
	The sheet icon indicates additional notes.
	Next to this icon you find further information.
	This icon marks tips.
	Next to this icon you find important notes.

1.4 Safety instructions

This section describes safety precautions which must be observed when installing and operating a product from Barco.

1.4.1 Standards

Safety regulations

NGC-105 is built in accordance with the requirements of the international safety standard IEC-60950-1, UL 60950-1 and CSA C22.2 No. 60950-1-06, which are the safety standards of information technology equipment including electrical business equipment.

These safety standards impose important requirements on the use of safety critical components, materials and isolation, in order to protect the user or operator against the risk of electric shock and energy hazard, and having access to live parts.

Safety standards also impose requirements to the internal and external temperature variations, radiation levels, mechanical stability and strength, enclosure construction and protection against risk of fire.

Simulated single fault condition testing ensures the safety of the equipment to the user even when the equipment's normal operation fails.

Electromagnetic interference

Electromagnetic emission of NGC-105 complies with EN55022, EN61000-3-2, EN61000-3-3 and the limits for a class A digital device, pursuant to Part 15 of the FCC Rules.

Electromagnetic immunity of NGC-105 complies with EN55024.

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

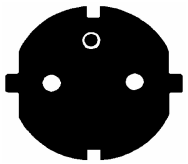
1.4.2 Precautions

For your own protection, observe the following safety precautions when operating and servicing your device:

- Before operating the units please read this manual thoroughly and retain it for future reference!
- Observe all warnings and instructions printed on the devices!
- Servicing not explicitly mentioned in this manual should never be carried out by unauthorized personnel! Never open the case of the unit without first disconnecting the power supply cord!
- To prevent fire or electric shock hazard, do not expose this unit to rain or moisture!
- This product should be operated from an AC power source!
- Check that the voltage and frequency of your power supply match those printed on the device label with the rated electrical values!
- If you are not sure of the type of AC power available, consult your dealer or local power company!
- This product is equipped with a 3-wire grounding plug, a plug having a third (grounding) pin. This plug will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug!
- This equipment must be grounded (earthed) via the supplied 3 conductor AC power cable. (If the supplied power cable is not the correct one, consult your dealer.)

Mains lead (AC power cord) with CEE 7 plug:

The wires of the mains lead are colored in accordance with the following code:



yellow + green	Earth (Ground)
blue	Neutral
brown	Line (Live)

Figure 1-1
CEE 7 plug

Power cord with NEMA 5-15 plug:

- The cord set must be UL-approved and CSA-certified.
- The minimum specification for the flexible cord is No. 18 AWG, Type SVT or SJT, 3-conductor.
- The cord set must have a rated current capacity of at least 10 A.
- The attachment plug must be an Earth-grounding type with a NEMA 5-15P (10 A, 125 V) configuration.

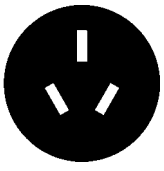
The wires of the power cord are colored in accordance with the following code.

green or yellow + green	Earth (Ground)
blue or white	Neutral
brown or black	Line (Live)

Figure 1-2
NEMA 5-15 plug

Power cord with GB 2099 plug:

The wires of the power cord are colored in accordance with the following code.



yellow + green	Earth (Ground)
blue	Neutral
brown	Line (Live)

Figure 1-3
GB 2099 plug

- Do not allow anything to rest on the power cord. Do not locate this product where people will walk on the cord. To disconnect the cord, pull it out by the plug. Never pull the cord itself.
- If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating.
- Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock.
- Never spill liquid of any kind on the product. Should any liquid or solid object fall into the cabinet, unplug the set and have it checked by qualified service personnel before resuming operations.
- Lightning - For extra protection for this video product during a lightning storm or when it is left unattended and unused for a long period of time, unplug it from the wall outlet. This will prevent damage to the unit due to lightning and AC power-line surges.

Due to high touch current, the NGC-105 is intended to be used in a location having equipotential bonding:

- The building installation shall provide a means for connection to protective earth.
- The equipment is to be connected to that means.
- A service person shall check whether or not the socket outlet from which the equipment is to be powered provides a connection to the building protective earth. If not, the service person shall arrange for the installation of a protective earthing conductor from the separate protective earthing terminal to the protective earth wire in the building.

1.4.3 Unpacking of devices

Note advises on the packaging for unpacking!

1.4.4 Installation

Only authorized personnel may install the device!

- Use only the power cord supplied with your unit. While appearing to be similar, other power cords have not been safety tested at the factory and may not be used to power the unit. For a replacement power cord, contact your dealer.
- Slots and openings in the cabinet and the sides are provided for ventilation; to ensure reliable operation of the unit and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This unit should not be placed in a built-in installation or enclosure unless proper ventilation is provided.
- The maximum recommended ambient temperature for this equipment is 40° C.
- When using the unit in a multi-unit rack assembly or closed assembly the ambient temperature inside the assembly may not succeed the maximum rated ambient temperature.
- When installed in a rack, the installation should be such that the amount of air flow required for safe operation of the equipment is not compromised. The mounting of the equipment should be such that no hazardous condition is achieved due to uneven mechanical loading.

1.4.5 Servicing

Mechanical or electrical modifications others than described in this manual must not be made to the devices. Barco is not liable for damages resulting from modified devices.

Only authorized personnel should carry out other maintenance work not explicitly mentioned in this users manual!

Never open the case of NGC-105! Measurements and tests with the opened device may be carried out only in the factory or by specially trained personnel, due to the dangers of electric shock.

1.4.6 Cleaning

Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. See section 5.3 Cleaning for a cleaning instruction!

1.4.7 Re-packing

Keep the original shipping carton and packing material; they will come in handy if you ever have to ship your unit. For maximum protection, repack your set as it was originally packed at the factory.

1.5 Online manual

On the NBMS hardware documentation CD **R59770184** this manual **R59770204** can also be found in electronic form. Insert the NBMS hardware documentation CD **R59770184** in the CD ROM drive of your PC. If autorun is enabled on your computer the start page of the CD comes up. If the CD does not start automatically, use Windows Explorer to open the file **index.htm** from the CD. Follow the links to the documentation of the NGC-105 and choose the related documentation**.**

Acrobat Reader can be used to view **R59770204_XX_owners.pdf**. Adobe® Acrobat® Reader is free and freely distributable software that lets you view and print Adobe Portable Document Format (PDF) files.

If Acrobat Reader is already installed, the manual can be viewed just by a click on the link. Else the Acrobat Reader must be installed first. Its setup program can be found on the CD in section **3rd party tools**.

The NBMS hardware documentation CD provides also access to the individual user's manuals of the NGS boards and further NBMS documentation.

2 Summary

This chapter gives an overview about the features of NBMS in general and NGC-105 in particular.

2.1 Properties

Barco's Networked Broadcast Monitoring System (NBMS) enables operators to monitor their broadcast processes and visualize video content in real-time from anywhere in the facility. This innovative solution allows high-quality, low latency distribution of video sources and metadata over an IP network towards multiple screens, even in separate control rooms, hereby offering ultimate flexibility for broadcast and distribution monitoring.

The distributed architecture of the Networked Visualization solution enables video content to be captured once – in any location – and distributed and displayed as many times as required in any location.

The system's extended metadata monitoring and alarm capabilities enable proactive monitoring by exception – improving operational efficiency and reducing downtime.

The Networked Broadcast Monitoring System comprises:

- **A new network approach**
  Networked Visualization breaks down the traditional AV equipment functionality and enables complete solutions to be built using intelligent displays, high-performance encoders/decoders, and management and control software built on industry-standard IT infrastructures. This enhances the flexibility, scalability and reach needed in today's broadcast environments at significantly lower costs.
- **Network streaming**
  Industry-standard technologies and protocols, including IP multicasting and JPEG2000, are used as far as possible. JPEG2000 compression enables visual information to be scaled to the appropriate size for the display being used. This means video signals can be streamed over the Ethernet network at the appropriate quality for the viewing application without using bandwidth unnecessarily.
- **Application management**
  The extended metadata monitoring and alarming capabilities of NGC-105 enable proactive monitoring by exception. Fault conditions on the incoming video and audio feeds can be detected and the operator can be notified of these errors in a variety of ways. The controller communicates the alarm to network management systems via Web services.
- **Redundancy**
  Redundant networking based on Ethernet technology, duplication of the central processing machine and N+1 redundancy on the output modules when combined with dual input projection modules.
- **Serviceability**
  The NGC-105 comprises a rack-mountable chassis, featuring redundant power supplies and an optional SMC-101 shelf management module, and is equipped with hot swappable auto-sensing NGS input boards supporting both standard and high definition video feeds.
- **High flexibility**
  To distribute sources to any viewer from rear projection displays to PCs to enable remote monitoring/viewing

System architecture

Barco's NBMS solution consists of high-quality rear-screen projection modules or LCD panels, a networked hardware platform and a Broadcast Monitoring Suite software package:

- A single screen is capable of simultaneously displaying multiple sources together with related metadata, audio metering information and computer applications. Two or more modules can be combined into a huge display wall to monitor hundreds of signals.
- The networked hardware platform may be divided into 3 physical components: the source capturing units, the interconnecting IP network with the central server and the display generating units. All components are designed as standard rack-mountable chassis.
- The BMS software package allows complete system control and is accessible from any system network connection.

NGC-105

The NGC-105 is a 5-slot chassis capable to house all NGS-type source capturing units. The NGS-boards capture the sources connected to them and convert them into streams. These streams are fed to the video network and can be displayed on any NBMS display generation unit on the same network.

The NGC-105 provides:

- 5 slots for NGS processing and connection boards
- 1 slot for optional SMC-101 shelf management module
- 1 or 2 power modules for standard or redundant power operation
- 2 fans
- all components are hot swappable
- extensive monitoring functions via the optional SMC-101

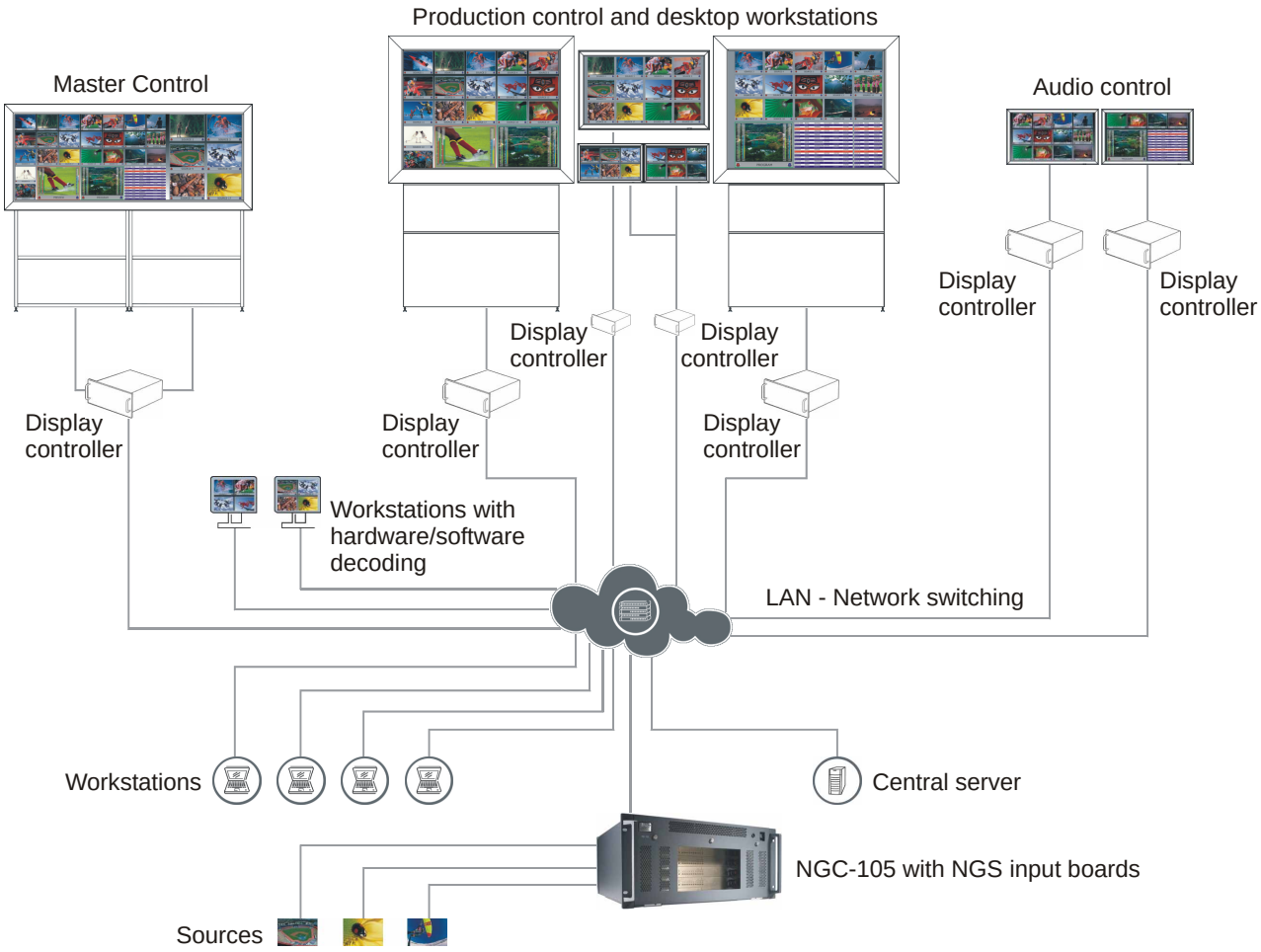


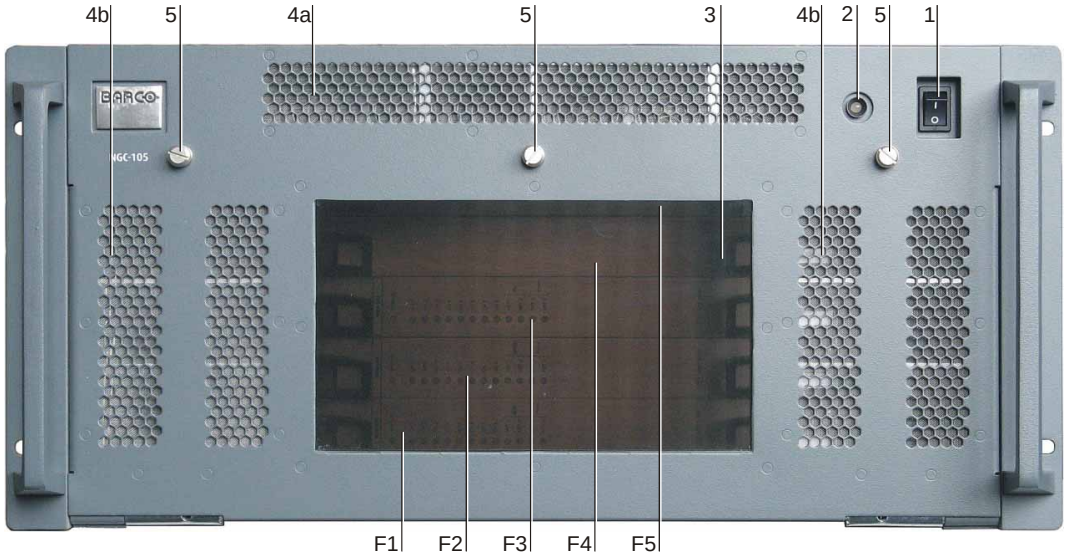
Figure 2-1
NBMS architecture with NGC-105 for input modules

3 The device and its components

This chapter describes the setup of the NGC-105.

3.1 NGC-105

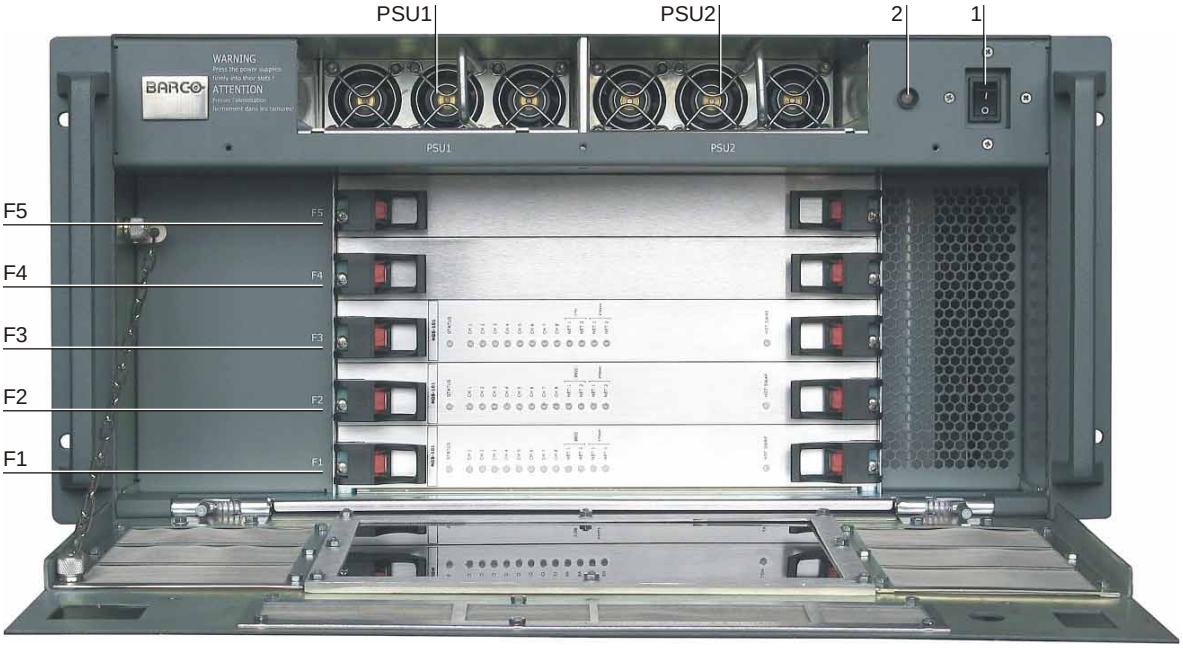
3.1.1 The front



1	power switch
2	status LED – only operable with SMC-101: off – power switched off red – during startup, while SMC-101 is still booting – after startup indicates a defective component or a component with critical operating condition green – operating
3	vision panel, giving view to the status LED's of the NGS processing boards
4a	air supply for power supply; airflow is from front to back
4b	air supply for boards cooling; airflow is from front to back
5	fixation screws for front flap
F1-F5	numbering of the NGS processing boards

Figure 3-1
Front view of NGC-105

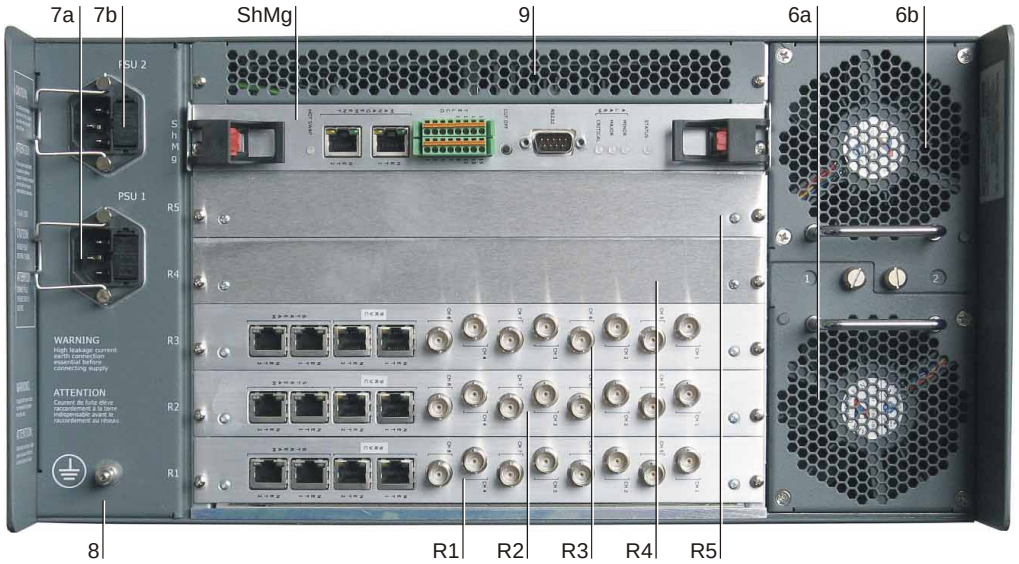
With the front flap opened the device looks like the figure below or similar:



1	power switch
2	status LED – only operable with SMC-101: off – power switched off red – during startup, while SMC-101 is still booting – after startup indicates a defective component or a component with critical operating condition green – operating
F1-F5	numbering of the NGS processing boards
PSU1, 2	slots 1 and 2 for power modules

Figure 3-2
Front view of NGC-105 with open front flap

3.1.2 The rear



6a/b	Fan module 1/2 with ventilation grille for board cooling, airflow is from front to back
7a/b	Mains connection for PSU1/PSU2 with cord retaining strain relief
8	connection for equipotential bonding conductor
9	ventilation grille for power supply cooling; airflow is from front to back
ShMg	SMC-101 – *optional*
R1-R5	rear slots for connection boards

Figure 3-3
Rear view of NGC-105

To protect NGC-105 from overheating, the air supply openings in the case shall be kept free of obstructions!

To disconnect the NGC-105 from the power supply all power cords have to be pulled of the mains connections [7]!

The back panel has to be easily accessible!

To ensure power redundancy take care to connect each two power modules to an independent power net.

The connection board slots

There are 5 slots for connection boards at the rear side of NGC-105 [**R1-R5**]. They are numbered from bottom to top. A corresponding label is printed on the device. Slots which are not equipped with connection boards are covered by a bracket. In the slot on the very top [**ShMg**] an SMC-101 can be used. Otherwise it is also covered by a bracket.

3.2 NGS-XXX

NGS boards are used to convert and encode video or data sources to JPEG2000 streams, which are provided to the video network. One NGS consists of a processing board, which is visible on the front and of a connection board, which is accessible on the rear.

The active processing board performs data conversion and provides visual feedback about the operation of the board by means of the LEDs on its front plate. The passive connection board provides connectors for video input and streaming output. For detailed information on usage and technical specifications of the NGS boards; please refer to the individual user manuals; see section 1.5 Online manual.

3.2.1 General interfaces and control elements

The processing boards have multiple LEDs at the front panel. The number of the LEDs depends on the type of the NGS. The LED far left is the status LED. Its function is identical for all NGS types. It also provides feedback on the operation the NGC-105.

The connection board is on its right part equipped with board specific connectors. In the left part at the very left edge there are two RJ45 connectors for the connection to the video net. The exact position of these two connectors may vary slightly on different NGS types. They are labeled **STREAM** or **STRM**.

Number	Interface	LED assignment
L1	LED: status	green – board status OK red – critical operation state (over-temperature, voltage out of range, ...) or board failure with the need to exchange it
N1	RJ45 connector: stream net – net 1	
N2	RJ45 connector: stream net – net 2	

Figure 3-4
Location of general interfaces on processing board (top) and connection board (bottom)

3.3 SMC-101 – shelf management module

The shelf management module SMC-101 is an optional board to control the working of the NGC-105 and for board management of all additionally inserted NGS-xxx boards. It is accessible on the rear of NGC-105.

For detailed information on usage and technical specifications of the SMC-101; please refer to the user manual; see section 1.5 Online manual.

3.3.1 General interfaces and control elements

The SMC-101has multiple LEDs at its front panel. The LED far right is the status LED.

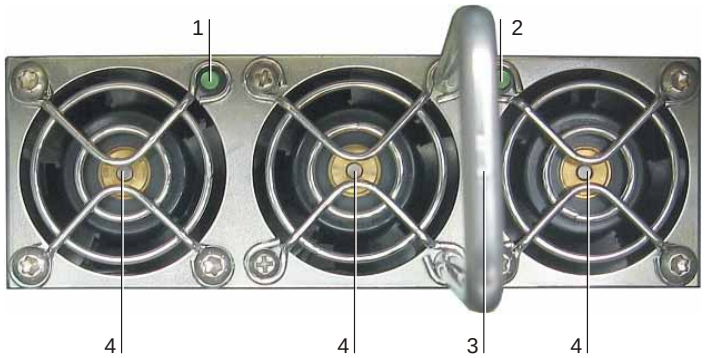
The connection board is in the upper part equipped with board specific connectors. In the lower part at the very bottom there are two RJ45 connectors for the connection to a redundant network. They are labeled **MANAGEMENT**.

Number	Interface	LED assignment
L1	LED: status	green – SMC-101 is running red – SMC-101 is not running, e.g. during boot up
N1	RJ45 connector: stream net – net 1	
N2	RJ45 connector: stream net – net 2	

Figure 3-5
Location of general interfaces on the SMC-101

3.4 Power module

The power modules have two LEDs each. The LEDs are located on the upper side. The power modules are located behind the front flap.



1	green LED: AC power OK (shines when power is connected)
2	green LED: DC power OK (shines after NGC-105 is switched on)

Figure 3-6
Power module

3.5 Connecting

The NGC-105 is set up and configured at your site by trained service personnel. Also the power and data cables are connected. The following section serves as a description, if you need to make changes on the operable system.

Network and data cables can be plugged while the system is running.

3.5.1 Network

To be able to transfer the streamed video and control data to other NBMS devices and to receive control commands, all connection boards of the NGC-105 provide redundant network connectivity for connection to a 1Gbit network for stream and data transfer. This network is referred as **video network**.

Video network

The video network is used to interconnect NBMS devices for data exchange. Visual data is encoded to JPEG2000 streams. The plugs that are used for the connection to the stream network are labeled **STREAM** or **STRM**.

Connect the plug **STREAM NET1** to the stream network. If redundancy is desired, connect also plug **STREAM NET2** to this network. Please see the figure below:

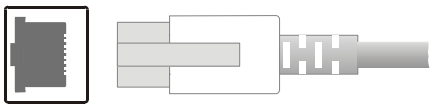


Figure 3-7
Network connection

Additional network connectors on a board (labeled **CTRL**, **SERVICE** or **SRVC**) are intended for service interactions and are not used in standard operation.

Do not connect them!

3.5.2 Video and data connection

Connection of video and data to the NGS connection boards depends on the type of the used board. Please refer to the individual NGS-XXX user's manuals; see section 1.5 Online manual.

3.5.3 Power supply

NGC-105 is designed to operate with single-phase power systems having a grounded neutral conductor. To reduce the risk of electric shock, do not plug into any other type of power system.

The NGC-105 must be connected to an equipotential bonding conductor [8] (see Figure 3-3 Rear view of NGC-105). If it is not connected ask authorized personnel to establish the connection!

Check the power rating on the wall outlet before connecting NGC-105 to the wall outlet or to a power strip. Contact the facilities manager or a qualified electrician if you are not sure what type of power is supplied to the building.

To connect the NGC-105 to the power supply, follow the steps below:

- Make sure that the power switch on the front is in the off position!

On the rear of NGC-105 there are two mains connections, labeled **PSU1** and **PSU2**. Each of which connects only to the corresponding power module. Therefore for each equipped power module the corresponding mains connection must be connected to a power supply:

- Plug the female end of the power cord into the mains connections at the rear (picture 1 below)
- Fix the cord retaining strain relief. Take care that it interlocks with the ribbing of the cable (picture 2 below)

1.

2.

Figure 3-8
Mains connection

- Plug the male end of the power cord into a power outlet.

To ensure power redundancy take care to connect the present power modules to independent power nets.

4 Operating

This chapter provides an instruction for the interactions you may do with the NGC-105.

WARNING

Operation actions not explained in this section bear the risk of electric shock!

If an operation action is needed that is not mentioned in this chapter, instruct authorized personnel with it!

4.1 Switching on and off

The NGC-105 is set up, configured and connected to the mains connection at your site by trained service personnel.

Switching on

Switch the power switch on the front of NGC-105 to the **I** position to switch the device on; please refer to Figure 3-1 Front view of NGC-105.

If an SMC-101 is used, the status LED [2] at the front of the NGC-105 first shines red while the SMC-101 is booting. When the SMC-101 is operable it shines green, provided that there are no alarms in the system; please refer to section 4.2 Alarms with SMC-101.

The fans start spinning and the NGS boards start booting. They require only short time to boot and initialize, as soon as they are operable the status LED [L1] on each board shines permanently green.

Switching off

Switch the power switch on the front of NGC-105 to the **O** position to switch the device off; please refer to Figure 3-1 Front view of NGC-105.

4.2 Alarms with SMC-101

If an SMC-101 is used in the NGC-105, then LEDs indicate a critical state of a component. The LEDs are on the one hand the status LED [2] at the front of the NGC-105 which then shines red, please refer to Figure 3-1 and on the other hand the alarm LEDs on the SMC-101 at the rear of the NGC-105. Further notification of alarms can be configured on the SMC-101; please refer to the SMC-101 user's manual.

Alarms on SMC-101

The SMC-101 knows three different alarm states: minor alarms, major alarms and critical alarms. For each of these states there is an LED on the SMC-101 to indicate this alarm. With default configuration of the SMC-101 only two of them are used, **minor** and **major** alarms. If an alarm occurs, this causes the status LED at the front to shine red until the reason for the alarm is resolved.

In case of a **major alarm** (i.e. the status LED at the front shines red and the LED major alarm at the SMC-101 shines red), the following should be checked:

4.2.1 Housing fans

The LED's at the fan modules are off, if they are working properly. If a fan spins too slowly or fast, or if it is broken, then its LED shines red and you have to replace this fan; please refer to section 5.2 Replacing Fans.

4.2.2 Processing boards of NGS-xxx

Look at status LED L1 at the processing board; please refer to Figure 3-4.

- A **major alarm** of an NGS-xxx changes the state of the LED L1 to red.

In case of a major alarm contact, instruct authorized personnel to check whether the board needs to be exchanged or not and in case to exchange it!

4.2.3 Power modules

Each power module has two LEDs. Both LEDs should shine green. If this is not the case i.e. one or both are off, then please refer to section 5.1 Replacing power modules.

4.2.4 SMC-101

The status LED L1 of the SMC-101 does not indicate a critical state of the board like the status LEDs L1 for the processing board do, but it shines red, when the board is not in its proper operating state, e.g. during boot up. If the boot process has been stopped somehow or other, then it might be necessary to reboot the SMC-101. This can be done in two ways:

- If the operation of the NGC-105 may be interrupted, then just switch the NGC-105 off and on again. Thus rebooting the SMC-101
- If the operation of the NGC-105 may NOT be interrupted, then instruct authorized personnel to remove the SMC-101 from the shelf and re-insert it in order to initiate a reboot!

5 Maintenance

NGC-105 requires very little maintenance. Some maintenance operations are nevertheless necessary to maintain distortion free operation of NGC-105. They can be done by means of the following descriptions.

WARNING

Maintenance operations not explained in this section bear the risk of electric shock!

If a maintenance operation is needed that is not mentioned in this chapter, instruct authorized personnel with it!

5.1 Replacing power modules

The power modules are hot-swappable. They are located behind the front flap. The two slots for power modules are located on the upper part on the front of the NGC-105. There is a labeling next to each slot **PSU1** and **PSU2**, indicating the number of the slot, please see the figure below:

Figure 5-1
Location and numbering of the slots for power modules

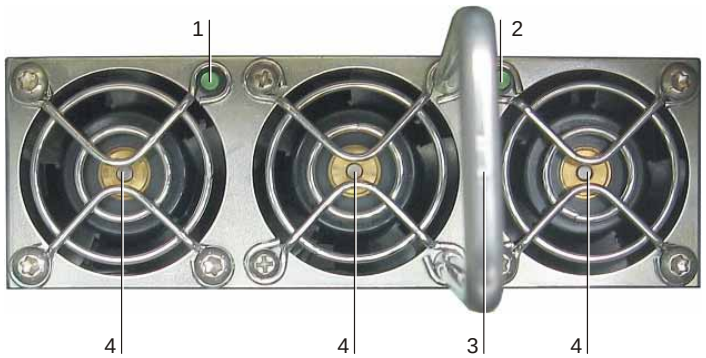
The NGC-105 can get equipped with one power module for non-redundant operation or with two power supplies for redundant operation.

In non-redundant operation it is recommended to use **PSU1** for the power module. This enables self-evident cabling, even though from technical point of view both slots are equivalent.

5.1.1 Determining a defective power module

If an SMC-101 is used with the NGC-105, then in case of the failure of a power module the status LED [2] at the front of the NGC-105 shines red, please refer to section 4.2 Alarms with SMC-101.

A defective power module can be determined by examining the LEDs at the power modules. If a power module is operating well, both LEDs at the front should shine green. If this is not the case, you can first check whether the mains connection of this power supply is connected to a wall outlet. The corresponding mains connection on the rear of the device is labeled identically like the slot of the power supply. If this connection is all right and the connected power net has not failed, then the power supply is defective and must be replaced.



1	green LED: AC power OK
2	green LED: DC power OK
3	handle bar
4	air supply openings

Figure 5-2
Power module

5.1.2 Exchanging a power module

Never touch the contacts on the backside of a power module. There is the danger of being harmed by residual voltage! Furthermore the operation of the power module might be impacted by impurities!

Use gloves to remove the power module. The cover of the power module is been used as heat sink for cooling, usually the temperature is around 50 – 60° Celsius under full operation!

While exchanging a power module at a running NGC-105, the other power modules must remain in operation to ensure operation.

- Open the front flap by unscrewing the screws [5] on the top of the front, please refer to Figure 3-1 Front view of NGC-105.
- Locate the defective power module by examining the *LEDs* [1], [2] on the individual power modules, please see above.
- Remove the defective power module by pulling at the *handle* [3]!
- Take a power module with the order number **R9832282** or **R9861200** out of its packaging.

Make sure it is a power module of type **Unipower TPCM3000-Z 1107**!

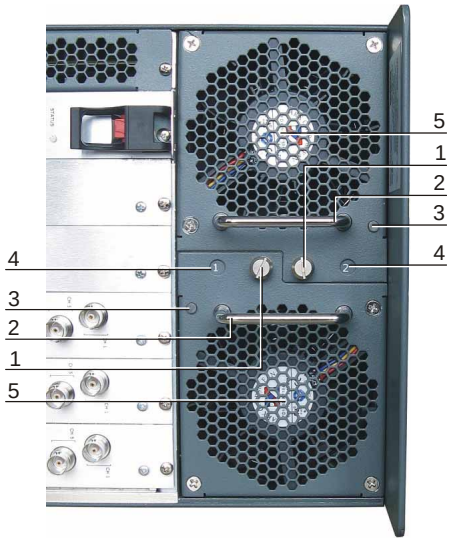
- Take care of the orientation of the power module (please refer also to the pictures above)!
  The handle bar must be more to the right and the LED's must be on the top.
- Push the power module carefully into the slot.
- The power module must be inserted unless the handle bar is so far inside the device, that the front flap can easily be closed. The closed front flap serves to fix the power module. Press the power module firmly into its slot.
- Check that both *LEDs* [1], [2] shine green!
- Check that the status LED [2] at the front of the NGC-105 shines green again!
- Close the front flap again and tighten the screws [5].

As soon as the defective power module is removed and the remaining power modules are working well, the status LED will also turn to shine green. It only indicates if a defective component was found in the shelf.

5.2 Replacing Fans

The two fans are located at the right side on the rear of the NGC-105.

The fans are not dimensioned for redundant operation. Therefore, if one fan fails it must be replaced immediately or the NGC-105 must be switched off. With only one fan running, critical temperatures are reached after 10 to 15 minutes!



1	knurl screw
2	handle bar
3	LED – only operable with SMC-101: off – fan OK red – fan too slow, too fast or failed
4	number of the fan module on the housing
5	air supply openings

Figure 5-3
Fan module

5.2.1 Determining the defective fan module

If an SMC-101 is used with the NGC-105, then in case of a fan failure the status LED [2] at the front of the NGC-105 and the LED of the failed fan shines red; please refer to section 4.2 Alarms with SMC-101.

If no SMC-101 is used, the defective fan can be detected watching the fans spinning through the air supply openings. If a fan spins too slow or not at all it is defective.

5.2.2 Exchanging the defective fan module

- Loosen the knurl screw [1] of the defective fan module (Picture 1 below)!
- Remove the fan module by pulling at the handle [2] (Picture 2 below)!
- Take a new fan module out of its packaging!
- Take care of the orientation of the fan module!
  Fan module 1 must be rotated until knurl screw and handle are on the upper part of the fan module.
  Fan module 2 must be rotated until knurl screw and handle are on the lower part of the fan module.
- Push the fan module carefully into the slot until the front sheet of the fan touches the sheet of the housing!
- Fasten the knurl screw until it is tightened.
- If an SMC-101 is used, check that the LED [3] of the fan is off, indicating normal operation and that the status LED at the front shines green again.

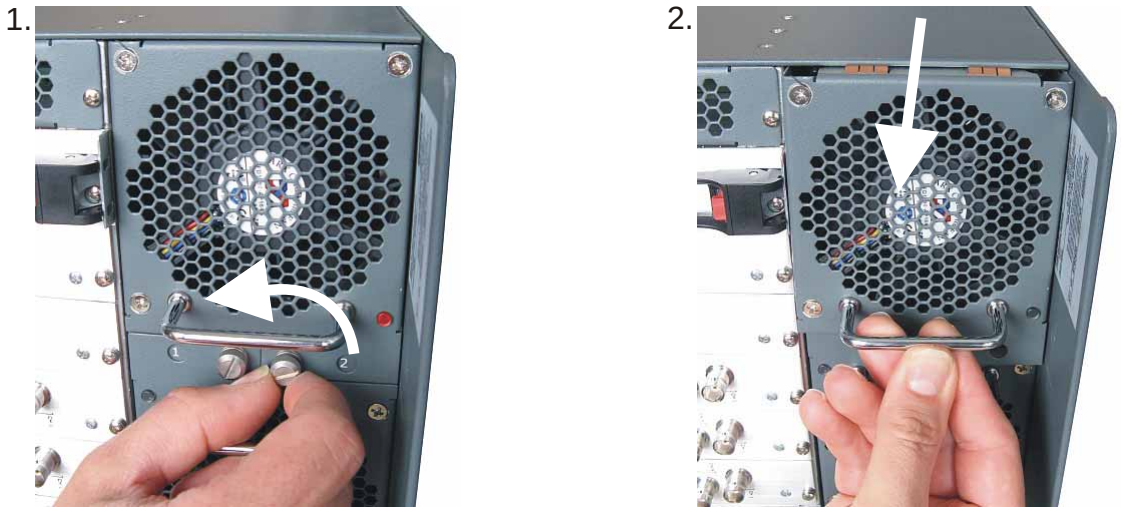


Figure 5-4
Two steps to exchange a fan module

5.3 Cleaning

5.3.1 Ventilation pads

The dust filters consist of fine metal mesh. These filters cannot be exchanged but are meant to be cleaned with a vacuum cleaner from time to time.

There are two procedures to clean the filters. The first procedure can be chosen, if it is possible to have a vacuum cleaner at the NGC-105. The second procedure explains how to remove the front cover and take it away for cleaning.

Vacuum-cleaning the filters on the device

If the device is not operating while being cleaned, the front flap can simply be cleaned with the vacuum cleaner.

During operation there is strong suction on the filter mesh. Therefore the flap must be opened to remove the suction on the filter mesh before cleaning.

- Open the front flap by unscrewing the screws [5] on the top of the front, please refer to Figure 3-1.
- Use a vacuum cleaner to remove the dust from the filter mesh. It is advisable to vacuum-clean the flap from both sides, outside and inside, to receive good results.
- Close the front flap again.

Removing the front flap for cleaning

The front flap can easily be demounted from the NGC-105 and taken to a place where it can be cleaned more easily.

- Open the front flap by unscrewing the screws [5] on the top of the front, please refer to Figure 3-1.
- The hinges of the front flap are established with an angular bolt at each side, please see the figure below. It is additionally hold by a chain.

1	knurl screw
2	angular bolt
3	strap hinge

Figure 5-5
Opened front flap with fixation elements

- Unscrew the knurl screw [1] to remove the chain from the front flap. Take care, the front flap is then no longer supported and it might be necessary to retain it.
- The bolts [2] are pressed outwards by springs. To remove the flap press both bolts together and turn them upwards into the strap hinges [3]. This releases the front flap from the hinge.
- Now you can carry the flap to a location where you want to clean it.
- Use a vacuum cleaner to remove the dust from the filter mesh. It is advisable to vacuum-clean the flap from both sides, outside and inside, to receive good results.
- Reinstall the front flap and close it again.

5.3.2 Cabinet

Never clean the case of NGC-105 without first switching off the device and disconnecting all power supply cords!

Do not use liquid cleaners or aerosol cleaners!

Use a soft cloth to periodically clean the cabinet. Stubborn stains may be removed with a cloth lightly dampened with mild detergent solution. Never use strong solvents, such as thinner or benzine, or abrasive cleaners, since these will damage the cabinet.

Unplug the device from the wall outlet before cleaning.

6 Technical appendix

This chapter provides tabular overviews about the technical details of NGC-105, its components and of their interfaces.

6.1 Technical data

NGC-105

chassis type	19" rackmount, 5U
dimensions (h/w/d) **dimensions (h/w/d) with handles**	222 mm/483 mm/509 mm | 8.7 in./18.9 in./20.0 in. 222 mm/483 mm/551 mm | 8.7 in./18.9 in./21.7 in.
weight with standard power supply **weigth with redundant power supply**	19 kg | 41 lbs. 20 kg | 44 lbs.
Power mains	100-240V, 14-6A, 50-60Hz
power consumption	700 W
inrush current **standard power supply** **redundand power supply**	 1 × 30A 2 × 30A
operating conditions	0°C to 40°C (at max. 80% humidity, non condensing)

Table 6-1

6.2 Order codes

Documentation	
R59770204	user's manual NGC-105, English
R59770205	installation and service manual NGC-105, English
R59770184	NBMS hardware documentation CD-ROM
Hardware	
R9832305	NGC-105 base unit
R9852467	dummy rear bracket
R9852468	dummy front board with bracket
GBP-2688-21	grounding kit
Spare parts	
R9832295	spare fan module
R9832282	spare power module 650W

Table 6-2

7 Trouble shooting

7.1 Contact

Helpdesk

Feel free to contact us if you have any further questions!

- **Barco N.V. - Europe**
  President Kennedypark 35, B-8500 Kortrijk
  Phone: +32 56 262 350, Fax: +32 56 233 013
  E-mail: support.smd@barco.com, Web: www.barcocontrolrooms.com

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